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ACANTHOCEPHALA IN NORTH AMERICAN AMPHIBIA *

H. J. Van Cleave

A careful search of the literature has revealed but a single instance in which Acanthocephala have been found parasitic in North American Amphibia. Stiles and Hassall (p. 352) record the occurrence of Acanthocephala in *Diemyctylus viridescens,* Raf. taken in Maryland by Dr. Hassall, though no determination of the species is given in the work cited. Through the courtesy of Dr. B. H. Ransom of the U. S. Bureau of Animal Industry the writer has been permitted to study these undetermined forms. The label accompanying this collection of seven worms bears the additional information that the host was taken at Franklin Falls, Baltimore, Md., in May, 1893, and that they were from the intestine. The location of the brain (Fig. 1) at the base of proboscis sheath, together with the fact that the retinacula proceed directly from the posterior end of the sheath give sufficient data for ascribing these specimens to the genus *Acanthocephalus* Koelr. Further the writer has determined them as belonging to the species *A. ranae* (Schrank).

The recent work of Lühe (1912) upon variability in the number of proboscis hooks in this species has led the writer to make a study of this point in the material at hand. In forty-three specimens collected from the same locality Lühe found the number of longitudinal rows of hooks varied from thirteen to nineteen (1912, p. 297), while the number of hooks in each row varied within the limits of four and six. Some individuals had rows of four hooks alternating with rows of five, some had five in each row, some had rows of five hooks alternating with rows of six hooks, while still others had six hooks in each row. Of the seven individuals of the American form which the writer has studied, four have the proboscis fully protruded. In every one of these the proboscis is armed with twelve rows of hooks and there are six or seven hooks in each row. These numbers agree precisely with the data given by Porta (1908, p. 228) for the hooks of *A. ranae* (Schrank). Unfortunately Porta does not give measurements for the hooks of the form he described under this name. He describes the embryos as being 0.07 to 0.09 mm. in length while Lühe (1911) records a length of 0.11 mm. and a breadth of 0.013 mm. for embryos of *A. ranae* from Germany. If the two authors are describing the same species there is far greater range of variability in the size of the embryos of this species than has come to the attention of the writer in a study of embryos of many species of Acanthocephala from the United States.

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* Contributions from the Zoological Laboratory of the University of Illinois, under the direction of Henry B. Ward, Urbana, Ill., No. 45.

A comparison of hook lengths in the American form with Lühe's data for *A. ranae* from Germany is given here, following Lühe's method of designating each hook. Since the hooks in two adjoining longitudinal rows alternate, those in the longest row are numbered from the tip posteriad: 1, 3, 5, 7, etc., while the hooks in the adjacent row are: 2, 4, 6, 8, etc. Lühe's measurements are for but a single row.

HOOK LENGTHS IN ACANTHOCEPHALUS RANAE (SCHRANK)

Hook	American Form	German Form Data from Lühe
1	59µ	60µ
2	71	..
3	71	70
4	71	..
5	71	75
6	77	..
7	77	80
8	77	..
9	77	75
10	71	..
11	71	50
12	53	..
13	30	—

Attention should be called to the fact that in representatives of this species found in North America the basal hooks in some rows are very much shorter than the basal hooks in the row adjoining (cf. 12 and 13 above).

Inasmuch as Lühe has found such great variability in numbers of hooks in *Acanthocephalus ranae* it is not beyond reason to expect that in his relatively small number of individuals (43) he did not include the full range of variability. The writer supports Porta's record of twelve longitudinal rows of hooks. The depression of Lühe's lower range of variability for number of longitudinal rows of hooks by one, and the extension of his upper range of the number of hooks in each of these rows similarly by one, are thus within the bounds of variability in this species. It was in view of these facts that the writer found it necessary to ascribe the specimens of the single North American collection of Amphibian Acanthocephala to the species *Acanthocephalus ranae* (Schrank). Unfortunately none of the specimens contained fully formed embryos. For that reason measurements of embryos had to be omitted from the all too few sources of data of value in the determination of species in the Acanthocephala.

The fact that there has been but one published record of Acanthocephala in Amphibia of North America led the writer into an investigation to determine whether this might be due to inadequate study and records of Amphibian parasites in this country or to a comparatively infrequent infestation of Amphibians with parasites of this class. The writer, personally, has records of the examination of over one hundred fifty Amphibia for parasites, chiefly from Illinois, none of which harbored Acanthocephala. The records of Leidy's extensive researches in parasitology, while including many references to other forms parasitic in Amphibia, contain no mention of Acanthocephala in that group. Dr. H. B. Ward has very kindly granted permission to include results of the examination of about fifty Amphibia contained in the records of his parasitological collection. His materials represented collections from seven different states in the central and western United States. His records indicate the absence of Acanthocephala in all Amphibia examined. The writer is also indebted to Dr. George R. La Rue who very kindly furnished data from the records of his collections. In over one hundred and thirty hosts, including numerous species both of Urodela and of Anura from six different states, including eastern, central, and western states, La Rue found no Acanthocephala. From all sources, then, the writer has data showing the absence of Acanthocephala in above three hundred specimens of Amphibia distributed in the following states: Illinois, Michigan, Kansas, Nebraska, Ohio, Pennsylvania, North Dakota, Oklahoma, and Missouri. Such a condition stands in marked contrast to the records of European investigators who have recorded several species of Acanthocephala from Amphibia with many cases showing high percentages of infestation. Thus, for

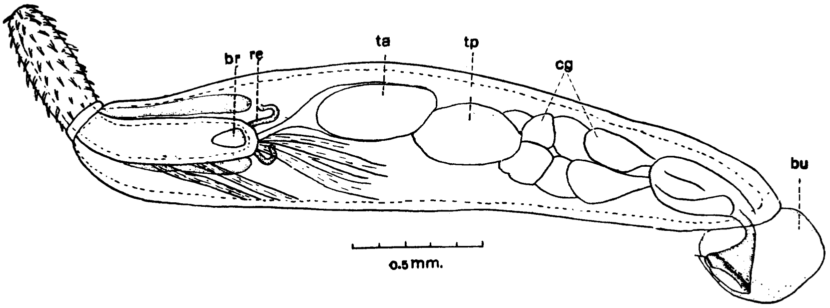

Fig. 1.—Acanthocephalus ranae (Schrank). Toto mount ♂. Stain, Ehrlich's Acid Hematoxylin. Damar mount; br, Brain; re, Retinacula; ta, Anterior testis; tp, Posterior testis; cg, Cement glands; bu, Copulatory bursa.

example, Mühling (p. 55) found 50 per cent. of *Rana esculenta* infested with *A. ranae* (=*E. haeruca*). European Amphibia also serve as intermediate hosts for larval Acanthocephala which attain maturity in the intestine of birds. *Corynosoma semerme* and *Centrorhynchus aluconis* both pass their larval stage in European Amphibia. So far no larval Acanthocephala are known in North American Amphibia.

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